

## Patent claims:

1. Screening process for hydantoin racemases,  
characterised in that
  - a) an enantioselective hydantoinase and
  - 5 b) the hydantoin racemase to be tested, which has a  
slower conversion rate compared with the  
hydantoinase under a), are allowed to act on
  - c) a chiral hydantoin, which is used in the opposite  
enantiomerically enriched form to the selectivity
  - 10 of the hydantoinase, and
  - d) the resulting N-carbamoyl-amino acid or the freed  
protons are detected in a time-dependent manner.
2. Process according to claim 1,  
characterised in that  
15 an aliphatically substituted hydantoin is used.
3. Process according to one or more of the preceding  
claims,  
characterised in that  
a hydantoinase from *Arthrobacter crystallopoietes* is  
20 used.
4. Process according to one or more of the preceding  
claims,  
characterised in that  
the ratio of the rate constants of the hydantoinase to  
25 the hydantoin racemase ( $k_{\text{hyd}}/k_{\text{rac}}$ ) is  $> 2$ .
5. Process for the preparation of improved hydantoin  
racemases,  
characterised in that
  - a) the nucleic acid sequence coding for the hydantoin
  - 30 racemase is subjected to a mutagenesis,
  - b) the nucleic acid sequences obtainable from a) are  
cloned into a suitable vector and the vector is  
transferred into a suitable expression system, and

c) the resulting hydantoin racemases having improved activity and/or selectivity and/or stability are detected by means of a process according to one or more of claims 1 to 4 and isolated.

5 6. rec-Polypeptides or nucleic acid sequences coding therefor obtainable according to claim 5.

7. Use of the polypeptides according to claim 6 in the preparation of enantiomerically enriched N-carbamoyl-amino acid or amino acids.

10 8. Use of the nucleic acid sequences according to claim 6 in the preparation of whole cell catalysts.

9. Hydantoin racemase containing in position 79 an amino acid substitution with an amino acid selected from the group consisting of A, R, N, D, C, Q, E, H, I, L, K, M, F, P, S, T, Y and V.

15 10. Hydantoin racemases containing the consensus sequence  $FX_1DX_2GL$  (Seq. 1), wherein  $X_2$  represents P or T and  $X_1$  represents in position 79 an amino acid selected from the group A, R, N, D, C, Q, E, H, I, L, K, M, F, P, S, T, Y or V.

20 11. Isolated nucleic acid sequence coding for a hydantoin racemase selected from the group:

- 25 a) a nucleic acid sequence coding for a hydantoin racemase according to claim 9 and/or 10,
- b) a nucleic acid sequence which hybridises under stringent conditions with the nucleic acid sequence coding for a hydantoin racemase according to claim 9 and/or 10 or with the sequence complementary thereto,
- 30 c) a nucleic acid sequence according to Seq.ID.No. 3, 5, 7 or 9 or a nucleic acid sequence having a homology of > 80% therewith,
- d) a nucleic acid sequence containing 15 successive

nucleotides of the sequences Seq.ID.No. 3, 5, 7  
or 9.

12. Whole cell catalyst containing a cloned gene for a hydantoin racemase according to claims 9 and/or 10.
- 5 13. Plasmids, vectors or microorganisms containing a nucleic acid sequence according to claim 9 and/or 10.
14. Primers for the preparation of the nucleic acid sequences according to claim 9 and/or 10 by means of PCR.